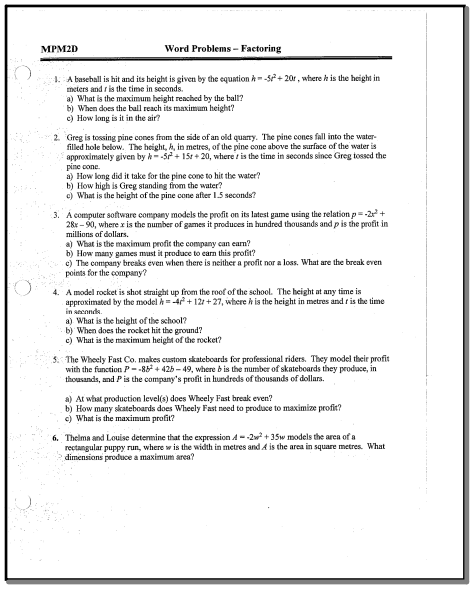

MPM2D **Word Problems – Factoring**

1. A baseball is hit and its height is given by the equation $h = -5t^2 + 20t$, where h is the height in meters and t is the time in seconds.
   a) What is the maximum height reached by the ball?
   b) When does the ball reach its maximum height?
   c) How long is it in the air?

2. Greg is tossing pine cones from the side of an old quarry. The pine cones fall into the water-filled hole below. The height, h, in metres, of the pine cone above the surface of the water is approximately given by $h = -5t^2 + 15t + 20$, where t is the time in seconds since Greg tossed the pine cone.
   a) How long did it take for the pine cone to hit the water?
   b) How high is Greg standing from the water?
   c) What is the height of the pine cone after 1.5 seconds?

3. A computer software company models the profit on its latest game using the relation $p = -2x^2 + 28x - 90$, where x is the number of games it produces in hundred thousands and p is the profit in millions of dollars.
   a) What is the maximum profit the company can earn?
   b) How many games must it produce to earn this profit?
   c) The company breaks even when there is neither a profit nor a loss. What are the break even points for the company?

4. A model rocket is shot straight up from the roof of the school. The height at any time is approximated by the model $h = -4t^2 + 12t + 27$, where h is the height in metres and t is the time in seconds.
   a) What is the height of the school?
   b) When does the rocket hit the ground?
   c) What is the maximum height of the rocket?

5. The Wheely Fast Co. makes custom skateboards for professional riders. They model their profit with the function $P = -8b^2 + 42b - 49$, where b is the number of skateboards they produce, in thousands, and P is the company's profit in hundreds of thousands of dollars.

   a) At what production level(s) does Wheely Fast break even?
   b) How many skateboards does Wheely Fast need to produce to maximize profit?
   c) What is the maximum profit?

6. Thelma and Louise determine that the expression $A = -2w^2 + 35w$ models the area of a rectangular puppy run, where w is the width in metres and A is the area in square metres. What dimensions produce a maximum area?